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CLAIMS:

1. A process for sealing at least one polymeric material to a polymeric catheter tube, comprising the steps of :

generating at least one annular beam of electromagnetic energy that is at least partially absorbed by at least one of the polymeric material and the polymeric catheter tube at a selected energy wavelength;

controllably directing the annular beam of electromagnetic energy onto the polymeric material to concentrate the energy in a bond site circumscribing the catheter tube to at least partially melt at least one material selected from the group consisting of the polymeric material and the polymeric catheter tube along the bond site and the immediate region thereof; and

allowing the at least one partially melted material to cool and solidify to form a fusion bond between the polymeric catheter tube and the polymeric material.

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2. The process of claim 1 wherein the polymeric material is a polymeric balloon material.

3. The process of claim 2 wherein the energy is substantially monochromatic.

4. The process of claim 2 wherein the energy is not substantially monochromatic.

5. The process of claim 2 wherein the energy is at least partially absorbed by the polymeric balloon material and the polymeric catheter tube.

6. The process of claim 2 wherein at least two annular beams of electromagnetic energy are generated.

7. The process of claim 6, the polymeric balloon material having a proximal end and a distal end, wherein a first annular beam is directed at the proximal end of the polymeric balloon material and a second annular beam is directed at the distal end of the polymeric balloon material.

8. The process of claim 7 wherein the first annular beam is directed to the proximal end of the polymeric balloon material at the same time that the second beam is directed to the distal end of the polymeric balloon material.

9. The process of claim 2 wherein the polymeric balloon material is formed from a polymer selected from the group consisting of: polyesters, polyolefins, polyamides, thermoplastic polyurethanes and their copolymers, polyethylene terephthalate, nylon, and combinations thereof.

10. The process of claim 2 wherein the energy is at least partially absorbed by the polymeric balloon material causing the polymeric balloon material to at least partially melt.

11. The process of claim 2 wherein the energy is at least partially absorbed by the polymeric catheter tube causing the polymeric catheter tube to at least partially melt.

12. The process of claim 2 wherein the energy is at least partially absorbed by the polymeric catheter tube causing the polymeric catheter tube to at least partially melt and by the polymeric balloon material causing the polymeric balloon material to at least partially melt.

13. The process of claim 1 wherein the polymeric material is a retention sleeve.

14. The process of claim 1 wherein the polymeric material is a sheath or catheter tube.

15. The process of claim 1 wherein the annular beam is substantially circular.

16. The process of claim 1 wherein the annular beam is not substantially circular.

17. A process for forming a fluid tight seal between a polymeric body and a polymeric dilatation member surrounding the polymeric body, comprising the steps of:

positioning a polymeric dilatation member along and in surrounding relation to a polymeric body with the polymeric dilatation member and polymeric body aligned to place a first surface portion of the polymeric dilatation member and a second surface portion of the polymeric body in a contiguous and confronting relation;

generating an annular beam of substantially monochromatic electromagnetic energy that is at least partially absorbed by at least one of the polymeric dilatation member and the polymeric body;

controllably directing the annular beam of substantially monochromatic energy onto the polymeric body and the polymeric dilatation member to concentrate the monochromatic energy in a narrow bond site circumscribing the polymeric body and running along the interface of the first and second surface portions, thus to melt the polymeric materials along the bond site and the immediate region thereof; and allowing the previously melted polymeric material to cool and solidify to form a fusion bond between the polymeric body and the polymeric dilatation member.

18. The process of claim 17 wherein the polymeric body is a catheter tube.

19. The process of claim 17 wherein the polymeric body is a length of catheter tubing, and the polymeric dilatation member is a catheter balloon positioned along a distal end region of the catheter tubing and including proximal and distal neck portions, a medial region having a diameter substantially larger than that of the neck portions, and proximal and distal tapered conical regions between the medial region and respective neck regions.

20. The process of claim 17 wherein the polymeric body is formed from a polymeric material selected from the group consisting of: polyesters, polyolefins, polyamides, thermoplastic polyurethanes and their copolymers and combinations thereof.

21. The process of claim 17 wherein the polymeric body is formed from a polymeric material selected from the group consisting of: polyethylene terephthalate, nylon, polyolefin, and their copolymers and combinations thereof.

22. The process of claim 17 wherein the annular beam is substantially circular.

23. The process of claim 17 wherein the annular beam is not substantially circular.

24. A process for simultaneously bonding at least two polymeric materials to a catheter tube comprising the steps of

providing a catheter tube having at least a first predetermined bonding location and a second predetermined bonding location for bonding a polymeric material thereto, each bonding location having a polymeric material circumscribing the catheter tube at the bonding location;

simultaneously generating a first annular beam of electromagnetic energy that is at least partially absorbed by the polymeric material at the first bonding location and a second annular beam of electromagnetic energy that is at least partially absorbed by the polymeric material at the second bonding location;

controllably directing the first annular beam of electromagnetic energy onto the polymeric material at the first bond location to concentrate the energy in the first bonding location circumscribing the catheter tube and at least partially melt the polymeric material along the first bonding location and the immediate region thereof and simultaneously controllably directing the second annular beam of electromagnetic energy onto the polymeric material at the second bonding location to concentrate the energy in the second bond location circumscribing the catheter tube and at least

partially melt the polymeric material along the second bonding location and the immediate region thereof

allowing the previously melted polymeric materials in the first and second bonding locations to cool and solidify to form fusion bonds between the catheter tube and the polymeric material at the first and second bonding locations.

25. The process of claim 24 wherein the polymeric material circumscribing the catheter tube at the first and second bonding locations is polymeric balloon material.

26. A process for simultaneously welding the proximal and distal ends of a balloon made of polymeric material to a catheter tube comprising the steps of:

generating a first annular beam of electromagnetic energy at a wavelength that is at least partially absorbed by the balloon and a second annular beam of electromagnetic energy at a wavelength that is at least partially absorbed by the balloon;

controllably directing the first annular beam toward the proximal end of the balloon to concentrate the energy in a narrow bond site circumscribing the catheter tube and running along the interface of the catheter tube and the proximal end of the balloon thus to melt the polymeric materials along the bond site and the immediate region thereof;

simultaneously controllably directing the second annular beam toward the distal end of the balloon to concentrate the energy in a narrow bond site circumscribing the catheter tube and running along the interface of the first and second surface portions, thus to melt the polymeric materials along the bond site and the immediate region thereof;

and allowing the previously melted polymeric materials to cool and solidify to form a fusion bond between the catheter tube and the proximal end of the balloon and between the catheter tube and the distal end of the balloon.

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27. A process for bonding at least one polymeric material to a polymeric catheter tube comprising the steps of :

generating at least one annular beam of electromagnetic energy that is at least partially absorbed by at least one of the polymeric material and the polymeric catheter tube at the selected energy wavelength;

controllably directing at least a portion of the annular beam of energy onto the polymeric material to concentrate the energy in a bond site circumscribing at least a portion of the polymeric catheter tube to at least partially melt at least one material selected from the group consisting of the polymeric material and the polymeric catheter tube along the bond site and the immediate region thereof; and

allowing the at least one partially melted polymeric material to cool and solidify to form a fusion bond between the polymeric catheter tube and the polymeric material.

28. The process of claim 27 wherein the polymeric catheter tube in the region of the bond site has a circular cross-section.

29. The process of claim 28 wherein the bond site circumscribes the entirety of the polymeric catheter tube and the entire annular beam is directed onto the polymeric material.

30. The process of claim 27 wherein a portion of the annular beam is blocked.

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